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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,648	05/05/2005	Thomas Blaffert	PHIDE020265US	9575
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EXAMINER TORRES, JOSE				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/533,648

Applicant(s)

BLAFFERT ET AL.

Examiner

JOSE M. TORRES

Art Unit

2624

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 7 and 9-20 is/are rejected.
- 7) ☒ Claim(s) 3-6 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Comments

1. The Amendment – After Non-Final Rejection filed on March 6, 2009 has been entered and made of record.

Specification

2. The amendment filed March 6, 2009 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: *"a computer executes a computer program stored on computer memory"*.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first and second paragraphs of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites the limitation "the combination of the pixels in the at least one pixel group" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. However, it appears to be "the forming of the at least one pixel group", and has been treated as such. Affirmation of this is required by the appropriate amendment.

5. Claim 9 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The claim limitation "*A device having a computer with computer memory*" is not properly supported by the originally filed specification, therefore, fails to comply with the written description requirement as stated in 35 U.S.C. § 112, first paragraph.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claim 10 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 10 defines "A computer program" embodying functional descriptive material (i.e., a computer program or computer executable code). However, the claim does not define a "computer-readable medium" or "computer-readable memory" and is thus non-statutory for that reason. The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim to embody the program on "computer-readable medium" or equivalent; assuming the specification does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission medium" which are deemed non-statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1, 2, 10-13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Hu et al. (U.S. Pat. No. 6,396,939).

Re claims 1, 9 and 10: Hu et al. disclose a method/device/computer program for the formation of a selective rendering of body structures ("*vertebra and its spinal canal*") of an object ("*three-dimensional object*") to be examined from a primary image data set ("*set of images*") that is executed on a computer (FIG. 1, "*Computer 12*"), the computer including computer memory ("*Storing Device 14*") that stores instructions that when executed on the computer, cause the computer to perform the steps of: forming at least one pixel group ("*The image range is then defined in step 106 by selecting first and last images of the range.*") which comprises pixels from the primary image data set ("*the set of images comprises slices of the entire spinal cord*") which are in conformity with predetermined filter criteria ("*a range of images corresponding only to the lumbar section of the spine*", Col. 5 lines 10-40); forming at least one pixel list by selection and/or deselection of at least one pixel group in conformity with predetermined criteria ("*When the identification of the group center position is successful and the pixels of the substructure common to every images of the group have been identified, the identification of the position of the substructure 154 in each images of the group can then be performed.*", Col. 6 lines 37-50); marking the pixels of the pixels groups of the at least one pixel list ("*region 166, in white on FIG. 5*", Col. 6 line 51 through Col. 7 line 4); forming a filtered secondary image data set ("*Filled Structure Image 162*") which includes the marked pixels (Col. 6 line 51 through

Col. 7 line 4); and forming the rendering from the secondary image data set (*"Once all the images of the range have been segmented, a person of ordinary skill in the art can build a three dimensional model of the structure, comprising the substructure, by using the segmented images **162** and a conventional three-dimensional reconstruction system."*, the marked pixels being rendered separately in highlighted or suppressed form (Col. 6 line 51 through Col. 7 line 9).

Re claim 2: Hu et al. disclose a plurality of image regions is defined (*"a vertebra and its spinal canal or a sacrum with its two foramens."*), wherein the pixels overlap at least partly (Abstract and Figures 3-8).

Re claim 11: Hu et al. disclose each of the at least one pixel group has a different corresponding predetermined filter criteria (*"Segmentation Strategy"*, Col. 5 lines 29-40).

Re claims 12 and 13: Hu et al. disclose the pixels in the secondary image data set are marked by setting an associated image value to a predetermined, uniform image value, wherein the predetermined, uniform image value is 0 (*"see region **166**, in white on FIG. 5"*, Col. 6 line 63 through Col. 7 line 4).

Re claim 15: Hu et al. disclose the pixels contained in the pixel list are marked in such a manner that the pixels are highlighted or diminished in color in the

subsequent rendering ("see region **166**, in white on FIG. 5", Col. 6 line 63 through Col. 7 line 4).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hu et al. in view of Beucher ("The Watershed Transformation Applied to Image Segmentation", Scanning Microscopy International, V. 6, 1991, pp. 299-314). The teachings of Hu et al. have been discussed above.

As to claim 7, *as understood*, Hu et al. fails to teach *the formation of the at least one pixel group* is performed by means of the watershed transformation which comprises the following steps: forming a gradient image data set in which each pixel is assigned a gradient image value which corresponds to the difference between the image value of this pixel in the primary image data set and the image value of the pixels surrounding this pixel; and defining the pixel group by defining a gradient image region of neighboring pixels which are separated from one another by a local maximum of the gradient image values.

Beucher teaches *the formation of the at least one pixel group* ("objects to be detected") is performed by means of the watershed transformation ("*watershed*

transformation") which comprises the following steps: forming a gradient image data set ("**morphological gradient** of a picture") in which each pixel is assigned a gradient image value which corresponds to the difference between the image value of this pixel in the primary image data set and the image value of the pixels surrounding this pixel (Section I-1, pp. 3-4); and defining the pixel group ("*Hierarchical Segmentation*") by defining a gradient image region of neighboring pixels which are separated from one another by a local maximum of the gradient image values (Section IV-3, pp. 22-25).

Therefore, in view of Beucher, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hu et al. by incorporating the watershed transformation for segmenting the image data set in order to provide a powerful tool for region-based and searches for pixel and region similarities (Introduction, pp. 1-3).

12. Claims 14, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hu et al.

As to claims 14, 16 and 17, Hu et al. does not explicitly disclose the pixels are marked by reducing the associated image value by a predetermined absolute value or relative amount; and selection/deselection is the inclusion/removal of a pixel group in a previously made selection.

However, since Hu et al. teaches the displaying of the structure/substructure in a filled structure image, wherein each of the pixel of the image is either part of the substructure, or of the rest of the structure (for example the white region in Figure 5). It

would be obvious to one of ordinary skill in the art the time the invention was made to reduce the pixel values corresponding to a structure/substructure by a relative amount, such as the pixel value, in order to represent the corresponding structure/substructures in white.

Also, as to the selection, deselection, inclusion and removal of pixels, it should be noted that Hu et al. selects a desired image range. Therefore, if the user wants to perform diagnosis only on the lumbar section of the spine, and the set of images contains the entire spinal cord, the user only select those images corresponding to the lumbar section thereby not selecting those images outside this range. A further group division is performed to increase the speed of the segmentation, also creating various groups (Col. 5 lines 22-65)

Therefore, in view of Hu et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce the marked pixels by a relative amount and include or remove pixel groups from a previously made selection in order to properly identify pixels belonging to an anatomical substructure and increase the speed of a segmentation process.

13. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hu et al. in view of Lucas (U.S. Pat. No. 5,555,352). The teachings of Hu et al. have been discussed above.

As to claims 18-20, Hu et al. fails to teach the pixel list is an enumeration list which contains a reference to the selected and deselected pixel groups; comprises all

pixels selected by selection and deselection, a reference to the corresponding pixels and the image values and coordinates of the corresponding pixels.

It should be noted however, that in view of Hu et al. it is well known in the art to a person of ordinary skill to provide the pixel values and coordinates of the pixels corresponding to the identified substructure in a list (Col. 6 lines 37-41).

Lucas teaches a rendering system **10** comprising a processor **14** that employs a list ("**L1**") of points that specify coordinate position as well as corresponding values at such positions (FIG. 2, Col. 3 line 6 through Col. 4 line 19).

Therefore, in view of Hu et al. and Lucas, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hu et al. by incorporating an enumeration list providing a reference, pixel values and respective coordinates of the pixels corresponding to a structure or a substructure in order to increase the speed of convention resampling techniques (Col. 2 line 66 through Col. 3 line 9).

Allowable Subject Matter

14. Claims 3-6 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the closest prior art made of record fails to teach or suggest a combination data tree is formed by assigning each pixel group to a node, and that the nodes are logically

assigned to one another in conformity with a predetermined combination criterion and the selection and deselection are performed by selection and/or deselection of the nodes, and there is formed a plurality of hierarchically structured combination data trees whose nodes are logically combined in conformity with at least one combination criterion.

Response to Arguments

Abstract

15. The abstract has been amended in order to be less than 150 words. Therefore, the objection has been withdrawn.

Specification

16. Applicants respectfully have not amended the specification to include section headings. However, upon further reconsideration, the objections have been withdrawn.

Claim Rejections under 35 U.S.C. § 101

17. Claims 1-9 have been amended in order to recite statutory subject matter. Therefore, the rejections have been withdrawn.

With respect to claim 10, Applicant's amendment has not overcome the rejection, since the claim still claims non-statutory subject matter. Therefore, the rejection is maintained.

Claim Rejections under 35 U.S.C. § 103

18. With respect to claims 1-10, Applicant's arguments have been fully considered but are moot in view of the new grounds of rejection.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bacus disclose a Method and Apparatus for Automatic Classification of Red Blood Cells, and Aramato, III et al. disclose an Automated Method and System for the Delineation of the Chest Wall in Computed Tomography Scans for the Assessment of Pleural Disease.

Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSE M. TORRES whose telephone number is (571)270-1356. The examiner can normally be reached on M-F: 8:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Werner can be reached on 571-272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jose M. Torres/
08/12/2009
Examiner, Art Unit 2624

/Brian P. Werner/
Supervisory Patent Examiner, Art Unit 2624